



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/728,490

12/05/2003

Mark T. Anderson

58623US002

9748

32692

7590

11/12/2010

3M INNOVATIVE PROPERTIES COMPANY

PO BOX 33427

ST. PAUL, MN 55133-3427

EXAMINER

CHACKO DAVIS, DABORAH

ART UNIT

PAPER NUMBER

1722

NOTIFICATION DATE

DELIVERY MODE

11/12/2010

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

LegalUSDocketing@mmm.com

LegalDocketing@mmm.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/728,490	<b>Applicant(s)</b> ANDERSON ET AL.	
	<b>Examiner</b> DABORAH CHACKO DAVIS	<b>Art Unit</b> 1722	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 August 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6,8-16,23-35,37 and 38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6,8-16,23-35,37 and 38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1, and 38, are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification in paragraph no. [0046], discloses that hybrid organic/inorganic reactive species can be used in the photoreactive compositions with or without the addition of inorganic particles. This is not the same as reciting that the hybrid organic/inorganic reactive species is used in said substantially inorganic photoreactive composition without the addition of inorganic particles. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1722

4. Claims 1-6, 8-16, 23-27, and 37-38, are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 2004/0012872 (Fleming et al., hereinafter referred to as Fleming) in view of U. S. Patent Application Publication 2003/0151032 (Ito et al., hereinafter referred to as Ito).

Fleming, in the abstract, in [0019], [0020], [0021], [0022], [0027], [0060], [0076], [0188], discloses a method of providing a photoreactive composition that is substantially organic, exposing the photoreactive composition to a multibeam exposure process (multi beam of at least four beams, and multiphoton reactive radiation, pulsed IR laser) so as to form reacted and non-reacted portions of the photoreactive composition to form a three-dimensional pattern (of exposed and unexposed areas), developing the photoreactive composition (remove reacted portions or non-reacted portions, remove exposed or unexposed areas with a solvent or chemical etching) to form a periodic pattern (interstitial void space of submicron dimensions). Fleming, in [0030], through [0042], and in [0043], discloses that the pattern can be formed by performing an exposure on single-photon photocurable materials i.e., upon exposure the single-photon photocurable materials undergo exposure via single-photon (one-photon) absorption. Fleming, in [0044], [0061], [0062], and [0063], discloses that selected regions of the photocurable material can be subjected to exposure to light (that has an appropriate wavelength and intensity) causing multiphoton absorption and photoreaction (photoreactive composition, upon exposure, undergoes a photoreaction). Fleming, in [0074], [0080], and [0082], discloses that the photoreactive composition can include silicone resin containing epoxy functionality and that epoxy-functional polymers include

Art Unit: 1722

epoxy functional silicones (claims 1-3, 8, 23-27, and 38). Fleming, in [0179], discloses that the photoreactive composition is further subjected to heating, causing the facilitation of dissolution of certain components and the dissipation of volatile components and therefore losses less than 60 percent of the its initial weight (upon irradiation and heating) (claims 5, and 37). Fleming, in [0028], and [0074], discloses that the photoreactive composition includes reactive species such as curable organic species, a photoinitiator, and inorganic particles such as siloxanes (claims 4, 6). Fleming, in [0028], [0108], [0124], [0134], discloses a photoinitiator that includes a multiphoton photosensitizer, electron donors such as amines, and electron acceptors such as iodonium salts or triazines (claims 9-10, and 15-16). Fleming, in [0099], discloses that the photon absorption of the multi-photon photosensitizer is greater than that of the fluorescein (claim 11-12). Fleming, in [0110], discloses that the multi-photon photosensitizer (with a large multi-photon absorption cross-section) in the photoreactive composition is Rhodamine B (claims 13-14). Fleming, in [0134], discloses that the photoreactive composition includes metal fluorides (metal complexes such as oxides) that are later irradiated during exposure (claims 17-22).

The difference between the claims and Fleming is that Fleming does not disclose the use of a plurality of inorganic particles in the photoreactive composition.

Ito, in [0028], [0046] through [0053], [0062], [0173] through [0183], [0185], and [1068], discloses the use of plural inorganic particles or conductive organic particles in the photosensitive composition.

Therefore, it would be obvious to modify Fleming by including inorganic particles in the photoreactive composition as suggested by Ito because Ito, in [0210], through [0219], and [0663]-[0665], discloses that using inorganic particles in the composition enables improved permittivity.

5. Claims 28-35, are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 2004/0012872 (Fleming et al., hereinafter referred to as Fleming) in view of U. S. Patent Application Publication 2003/0151032 (Ito et al., hereinafter referred to as Ito) as applied to claims 1-6, 8-27, and 37-38, and further in view of U. S. Patent No. 4,406,992 (Kurtz et al., hereinafter referred to as Kurtz).

Fleming in view of Ito is discussed in paragraph no. 2.

Fleming, in [0021], [0022], [0027], [0060], [0076], [0188], discloses removing reacted or unreacted (or both) portions of the photoreactive composition after exposure processes by developing or etching (claims 30-31).

The difference between the claims and Fleming in view of Ito is that Fleming in view of Ito does not disclose that the three-dimensional structures (interstitial voids) formed are deposited with a semiconductor material as recited in claims 28, 29, 32-35).

Kurtz, in col 3, lines 55-67, and in col 4, lines 29-32, discloses that the grating structure is filled with a semiconducting material such as silicon, wherein the grating has a refractive index that is different than that of the semiconductor (material filling the grating or interstitial voids).

Therefore, it would be obvious to a skilled artisan to modify Fleming in view of Ito by employing the method of depositing the claimed material on the gratings as

Art Unit: 1722

suggested by Kurtz, because Fleming, in [0002], discloses that the three-dimensional patterns (gratings) are formed using the multi-photon method, and Kurtz, in col 5, lines 59-64, in col 6, lines 1-3, discloses that using the semiconductor material to fill the grating enables the production of a semiconductor device (transducer) that is capable of high temperature operation.

### ***Response to Arguments***

6. Applicant's arguments, see Amendment, and Remarks, filed July 20, 2009, have been fully considered but they are not persuasive. Therefore, the 103 rejections made over claims 1-6,8-35, 37-38, have been maintained. A new 112 rejection has been made over claims 1, and 38. See paragraph no. 2, above.

A) Applicants argue that none of the references disclose that the hybrid organic/inorganic reactive species is used in said substantially inorganic photoreactive composition without the addition of inorganic particles

Fleming in paragraph nos. [0074], through [0096], discloses a substantially organic photoreactive species without the addition of inorganic particles. Also Kurt, in [0063], discloses the use of organic conductive particles in the composition. Also, see paragraph no. 2, above.

### ***Conclusion***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daborah Chacko-Davis whose telephone number is (571) 272-1380. The examiner can normally be reached on M-F 9:30 - 6:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's

Art Unit: 1722

supervisor, Cynthia H. Kelly can be reached on (571) 272-1526. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Daborah Chacko-Davis/  
Primary Examiner, Art Unit 1722  
November 8, 2010.